Appendix K

Home Sewage Treatment Systems in Delaware County

K.1: Map of HSTS Located within the Olentangy River Watershed, 2004
K.2: HSTS Objectives for Delaware County
K.3: Priority Areas for HSTS in Delaware County

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Appendix K.1

Map of HSTS Located within the Olentangy River Watershed, 2004

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Appendix Y GIS: HSTS located on Olentangy

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Appendix K.2

HSTS Objectives for Delaware County

Objectives	Resources	How	Time Frame	Performance Indicators	Loading
To review and adopt local sewage regulations	DGHD receives authority for siting and permitting sewage systems under Ohio Administrative Code 3701-29. Local HSTS regulations under review, and changes being proposed. New technology HSTS systems receive review and approval from Ohio Department of Health. No external funding necessary.	DGHD Staff	Jan. 2004-Jan. 2005	Copy of regulations	N/A
Provide assistance in Developing Ohio EPA Action plans for the Olentangy Watersheds	Watershed Coordinators: FLOW	DGHD Staff will develop action plans to address the HSTS impairments to water quality	Began 2003-2004	Copy of Action plans for each watershed	N/A
To complete HSTS database	DGHD staff time to develop a database to incorporate information such as year and type of HSTS system, date of last inspection, and system maintenance information, sampling results	DGHD staff	Jan. 2004-Dec. 2004	Evidence of database	N/A
To inventory all HSTS into the database with in the Olentangy Watershed	DGHD staff to do 10,000 HSTS data entry	DGHD staff	Jan. 2004-Jan. 2005	Evidence of completed database	N/A
Inventory Existing HSTS within the Olentangy Watershed Systems using GPS technology	DGDH staff time. Apply for 319 grant to receive funding to purchase additional GPS units and fund additional positions	The DGHD has two GPS units to locate sewage systems in Delaware County	2004-2006	Evidence of Shape files	N/A

Delaware General Health District

Objectives	Resources	How	Time Frame	Performance Indicators	Loading
Inspect all on-lot systems within the Olentangy Watershed Delaware County on a five-year cycle.	DGHD staff time Apply for 319 grant to fund additional staff positions	In-kind part-time services of Residential services staff. Apply for 319 grant funds for employment of two part-time credential interns to perform inspections and the possibility of hiring a R.S. position.	2005-2010	Evidence of database and inspection forms. Inspection form is included in	N/A
Inspect all aerators within the Olentangy watershed Delaware County annually.	DGHD staff Apply for 319 grant to fund additional staff positions	In-kind part-time services of Residential Services staff.	2005-2006	Evidence of database and inspection form. Inspection form is included in	N/A
Strengthen inspection policy and enforcement of failing systems	DGHD Staff time. Inspection program funded by either 319 grant and/or health levy.	The new sewage regulations at state level will mandate that local health departments inventory all new HSTS systems that are installed after regulations is adopted (proposed in 2004). During this inventory, all new system systems will be inspected at that time. All existing systems will be added to our database and the systems will be inspected at that time. Apply for 319 grant funding in 2004. Place money in the sewage budget to cover cost of an inspection program (health levy on the ballot in March, 2004.)	2005	Evidence of database – documentation of grant application - Documentation of inspection performed -levy on ballot	N/A

Delaware General Health District

Objectives	Resources	How	Time Frame	Performance Indicators	Loading
Issue orders requiring replacement and/or repair of malfunctioning sewage systems in priority areas	DGHD staff 319 grant funds/WPCLF revolving loan funds	Map analysis existing systems. (Upgrading failing HSTS is already an existing Board of Health policy and priority) -Apply for grant funding –Determine appropriate system to install – Secure 319 loan funds -Issue sewage permit –Perform inspection –Record system in database	2005-2010	Documentation of Board of Health priority – Documentation of sewage permit recorded, inspection made, Evidence of database	1,000 failing HSTS representing 360,000GPD
Use map as analysis tool for identifying concentrated areas of failed HSTS	DGHD staff time	Complete map analysis of "area of existing need" for failing and malfunctioning sewage systems	2004-2005	Documentation of approved sewer Plan for Delaware County.	N/A
Delaware County Draft Sanitary sewer expansion plan	DGHD staff to work collaboratively on the sanitary sewer Plan for approval with County Commissioners, 20/20 Committee	Advise public officials of "area of existing need" for sewered areas Assist in drafting sewer Plan for Delaware County Meet with County Commissioners –Plan approved -Plan implemented	Completed	Documentation of approved plan.	N/A
Delaware County Sanitary Sewer Plan	Approved by County Commissioners	Advise the community Begin construction Require homeowners to connect to sanitary sewer Advise homeowners to properly abandon HSTS	Sanitary sewer installed 2015	Documentation of an approved Plan.	N/A
Develop sampling policies and procedures for the watershed for water quality improvement studies	DGHD staff	Apply for 319 grant funds to create proposed sampling policies and procedures	2004	Documentation of policies and procedures	N/A

Delaware General Health District

Objectives	Resources	How	Time Frame	Performance Indicators	Loading
Quarterly homeowner HSTS maintenance workshops	DGHD Delaware County Watershed Coordinators –Develop action plan for phase II with other County officials -319 grant funds	Apply for 319 grant funds Create educational materials, Web site information - Distribute materials at community events –Sponsor workshops in the County	2004-continue annually	Number of workshop held and documentation of the evaluations – documentation and inventory of materials created or used –Web site available through County Note: one workshop held on November 6, 2003 with 52 in attendance. Another held on February 26, 2004, with 57 in attendance	N/A
Perform water sampling to complete water study improvement study	DGHD and volunteers	Apply for 319 grant funds to collect and analysis samples for fecal coliform	2006	Documentation of water sample results and records from wastewater treatment plants	N/A

Appendix K.3

Priority Areas for HSTS in Delaware County

Determining Priority Areas

GENERAL

When considering where our priority areas were, multiple factors were considered. Four principle factors were used in determining where are priority areas were. A weighted matrix was used to derive point totals for any parcel of land in the County based on the ArcView mapping in the DCRPC GIS. The following paragraphs describe the individual components of the matrix, or the high potential for failure due to the type and age of the systems and the soil suitability for on-site sewage disposal systems.

AREAS OF EXISTING NEED

A point score was derived for each potential area of existing need:

1. Off-lot discharging systems (7 points): Off lot systems have been used since the 1960s. With time it has become evident that off-lot aeration systems require more maintenance than most homeowners can properly perform. Pollution began to be apparent from many of these systems. Current Delaware General Health District policy generally prohibits any new off-lot discharging systems. They are also not approved for an existing lot unless an on lot system is not feasible. The Delaware General Health District will permit these systems to be installed when repairing an existing system, but only when on-lot repairs have been exhausted.

2. Sampling (7 points): Grab samples were taken from roadside ditches and drainage courses in areas where off-lot discharging systems are located and where past on-lot systems have failed (see failing systems below). The samples were tested for fecal coliform; which is a group of bacteria that indicate the presence of sewage contamination of a waterway and the possible presence of other pathogenic organisms. The Ohio Administrative Code, 3745-1-04-(F)-(1) has determined the threshold for fecal coliform bacteria is 5,000 fecal coliform counts per 100 millimeters in 2 or more samples. Some sites were not selected for sampling, due to time constraints.

3. Failing systems (6 points): Failing on-lot systems are also a potential threat to public health as surface drainage from untreated sewage finds its way to creeks and rivers. No particular area is known to have a large pollution problem, therefore, a pattern of failures in a specific area was sought over the past 10 years. Failures were sparsely scattered across the County. Age, soils, topography, weather, water table and water usage all have a bearing on how long a system will last. Since these results indicate problems with a particular system have existed in the past, we continued the mapping of failed systems to show likely areas in future need of central sewer. These areas were assigned a ranking of 3 or 4 depending on years of history in a particular area.

4. Age of System (6 points): Prior to 1974, sewage systems across the County varied widely because there were no state rules to guide local health departments in system

design. Systems that have reached 30 years in age are suspect. Systems were typically smaller before 1974, so the odds of these older systems failing are much greater than those of newer systems. These were assigned a ranking of 2.

5. Soil Types (2 points): Proper soil characteristics are important to the proper functioning of the on-lot sewage treatment systems. A history of complaints and trends of early and high failure rates were noted in soils that are very poorly drained. To alleviate the problem of adding untreated or partially treated sewage to waterways and watersheds, the Delaware General Health District has placed a restriction on the types of soils where on lot systems can be installed. Currently, the Delaware General Health District will not permit on-site systems to be installed in either soils that are very poorly drained (according to the Soil Conservation Service) or soils on severe slopes or floodplains.

   The use of certain technologies and construction techniques allow on-site systems in some of the marginally suitable soils. The general path of current development (between Alum Creek and the City of Delaware) has much of these very poorly drained soils and should not be developed with on site sewage systems therefore, central sewer is the primary consideration (see Map 4g). The existing areas of residential development in very poorly drained soils were assigned a ranking of 1.

6. Lot size < 1.0 acre (2 points): The Board of Health has determined that parcels smaller than one acre with private septic systems are at an increased risk of failure. This is due to an inadequate area of leaching, or the potential for sewage to escape to neighboring lots in case of failure.

The matrix results are listed in Appendix CC. This matrix shows a wealth of information including number of HSTS, year of HSTS, number of complaints, lot size and soil type.

In Appendix BB outlines “areas of existing need” based upon the above stated criteria, and those areas that are included in the matrix results. As the “Areas of Existing Need” indicates, there are portions of Delaware County that may not be sewered in the future (the proposed future sanitary sewer expansion is being proposed for SR 37 East and extending to south.) The documented areas of existing need as determined by the DGHD and that may not be sewered in the future include Olive Green, Porter Township; East Liberty, Porter Township; Kilbourne, Brown Township; Leonardsburg, Brown Township; Radnor, Radnor Township; Warrensburg, Scioto Township; and Norton, Marlboro Township. These areas will be our focus for applying the Ohio EPA Water Pollution Control Loan Fund (WPCLF) linked deposit funds as they are also areas, which may not have the resources to repair or replace failing HSTS.

The sewer service priorities are outlined in Appendix T. The future sewer service areas are shown in Appendix DD.

Please note that the following maps and matrix (Appendix CC, Appendix BB, Appendix T, and Appendix DD) are referenced in the text of Appendix K.3 of the Lower Olentangy Watershed Action Plan. Please see Appendix K.3, *Priority Areas for HSTS in Delaware County*, for further information.

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Delaware General Health District
2020 Sewer Master Matrix

	Lake of the Woods 172 lots			Radnor East and West 129 lots			Condit S 55 lots Condit N 62 lots			Center Village 110 platted lots			Lucy Depp 25 dwellings			Hanawalt/Taylor Way 35 lots total one vacant			Olive Green 64 parcels		
	Weight	**Number of**	**Total**	**Weight**	**Number of**	**Total**	**Weight**	**Number of**	**Total**	**Weight**	**Number of**	**Total**	**Weight**	**Number of**	**Total**	**Weight**	**Number of**	**Total**	**Weight**	**Number of**	**Total**
# of off lot systems	5	114	570	5	5	25	5	2	10	5	6	30	5	3	15	5	30	150	5	4	20
FC Sampling Results > 5,000																					
4 samples taken										5	1	5									
5 samples taken				5	5	25										5	3	15			
6 samples taken	5	0	0										5	3	15				5	3	15
10 samples taken							5	0	0												
# of Complaints 0-5 yrs	4	4	16	4	1	4	4	3	12	4	1	4	4	1	4	4	2	8	4	0	0
# of Complaints 5-10 yrs	3	0	0	3	3	9	3	0	0	3	3	9	3	2	6	3	0	0	3	0	0
Age of System - Before 1974	3	0	0	3	116	348	3	103	309	3	13	39	3	23	69	3	30	90	3	57	171
Age of System - After 1974	2	172	344	2	8	16				2	97	194	2	1	2	2	4	8	2	7	14
S=5							2	12	24												
Lot Size <= 1.0 Acre	1	10	10	1	101	101				1	94	94				1	30	30	1	43	43
# of plotted lots													1	287	287						
S=30, N=30							1	62	62												
Soil Type													1	0	0						
High Bedrock	1	172	172																		
Pewamo/Condit				1	30	30	1	19	19	1	53	53							1	4	4
Unsuitable Soil Type																					
Pewamo/Condit																1	0	0			
Subdivision Grand Total			**1112**			**558**			**436**			**428**			**398**			**301**			**267**

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Delaware General Health District
2020 Sewer Master Matrix

	Covan Drive 34 lots			Harriott/Concord 71 lots			Mayfair Drive/Court 23 lots			Woods of Glen Erin 55 lots total			Kilbourne 103 lots			Norton 29 lots		
	Weight	**Number of**	**Total**	**Weight**	**Number of**	**Total**	**Weight**	**Number of**	**Total**	**Weight**	**Number of**	**Total**	**Weight**	**Number of**	**Total**	**Weight**	**Number of**	**Total**
# of off lot systems	5	26	130	5	10	50	5	17	85	5	10	50	5	0	0	5	1	5
FC Sampling Results > 5,000																		
2 samples taken							5	1	5									
3 samples taken	5	0	0													5	0	0
4 samples taken													5	0	0			
6 samples taken										5	4	20						
Bad Sample Results				5	0	0												
total # of samples																		
# of Complaints 0-5 yrs	4	0	0	4	0	0	4	1	4	4	1	4	4	1	4	4	0	0
# of Complaints 5-10 yrs	3	0	0	3	6	18	3	0	0	3	0	0	3	1	3	3	3	9
Age of System - Before 1974	3	0	0	3	8	24	3	20	60	3	0	0				3	24	72
only found 17													3	17	51			
Age of System - After 1974	2	34	68	2	63	126	2	3	6	2	45	90	2	3	6	2	5	10
Lot Size <= 1.0 Acre	1	0	0	1	8	8	1	17	17	1	0	0	1	91	91	1	14	14
2.0 + in size																		
Soil Type																		
High Bedrock # lots							1	18	18									
Pewamo/Condit				1	0	0							1	0	0	1	4	4
Pewamo/High Bedrock	1	34	34															
Unsuitable soil type										1	2	2						
Subdivision Grand Total			**232**			**226**			**195**			**166**			**155**			**114**

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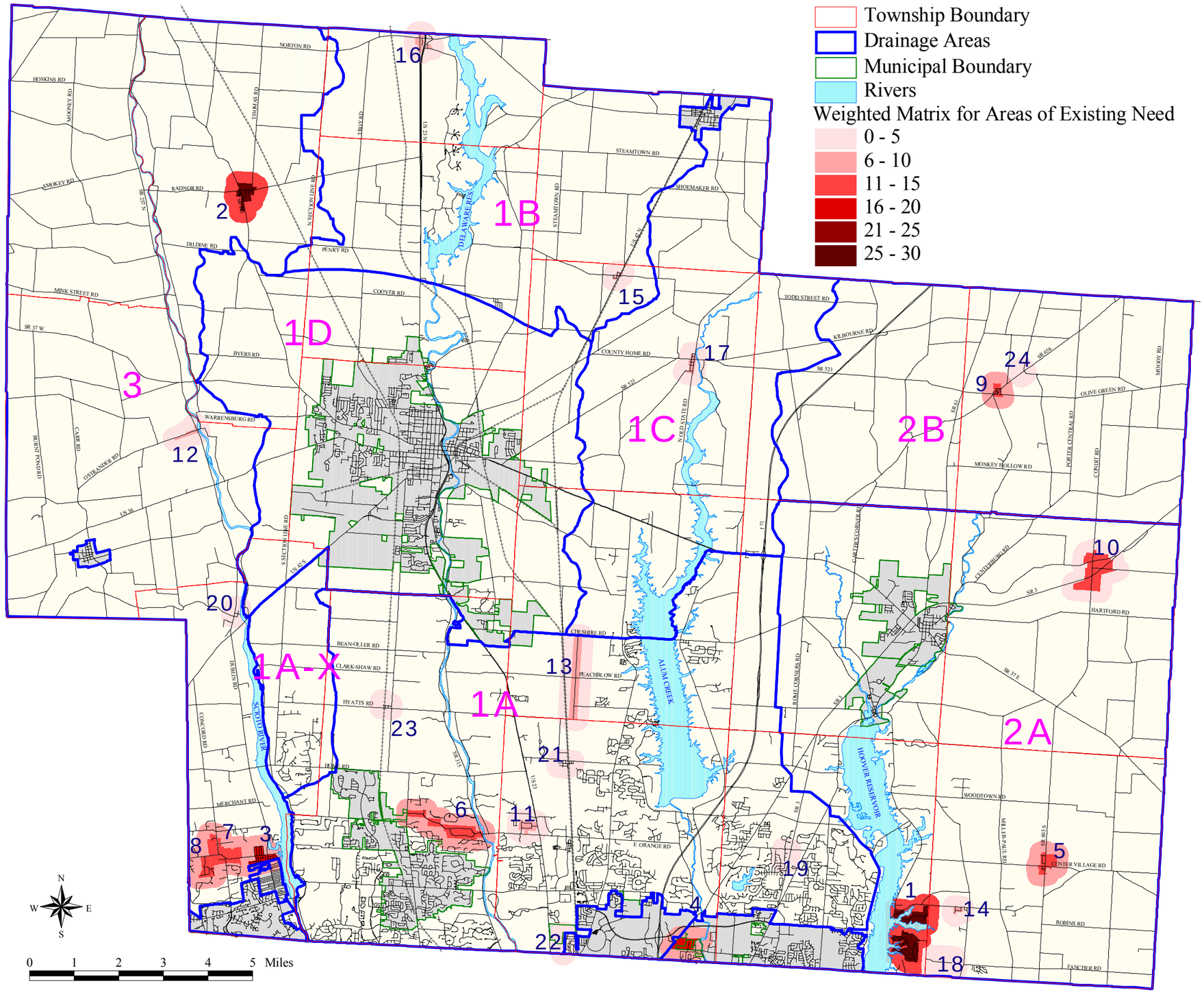

Appendix BB: Areas of Existing Need

The following criteria were weighted as listed below and each grab site was given scores according to grab results.

# of off lots systems	7
FC Sampling Results>5000	7
# of complaints 0-5 years	3 ½
# of complaints 5-10 years	2 ½
Age of System (Before 1974)	3
Age of System (1975-1990)	2
Age of System (After 1991)	1
Lot Size <= 1.0 acre	2
Soil Type (High Bedrock)	2

The results of the grab tests were as follows:

Table 6a. Areas of Existing Need Points

No.	Site	Total Points
1	Lake of the Woods	30.0
2	Radnor	27.7
3	Lucy Depp	18.3
4	Hanawalk/Taylor Way	15.8
5	Center Village	14.9
6	Wren/Carriage Lane	14.6
7	Harriott/Concord	13.0
8	Woods of Glen Erin	12.8
9	Olive Green	11.5
10	Condit	10.8
11	N/S Parkway	9.0
12	Warrensburg	9.0
13	Piatt Road	8.2
14	Mayfair Dr/Ct.	7.8
15	Leonardsburg	7.5
16	Norton	6.8
17	Kilbourne	6.0
18	Covan Drive	4.7
19	Perkins Lane	4.3
20	Bellpoint	2.9
21	Lewis Center	2.9
22	Arnold's Place	2.2
23	Hyatts	1.9
24	East Liberty	0.4

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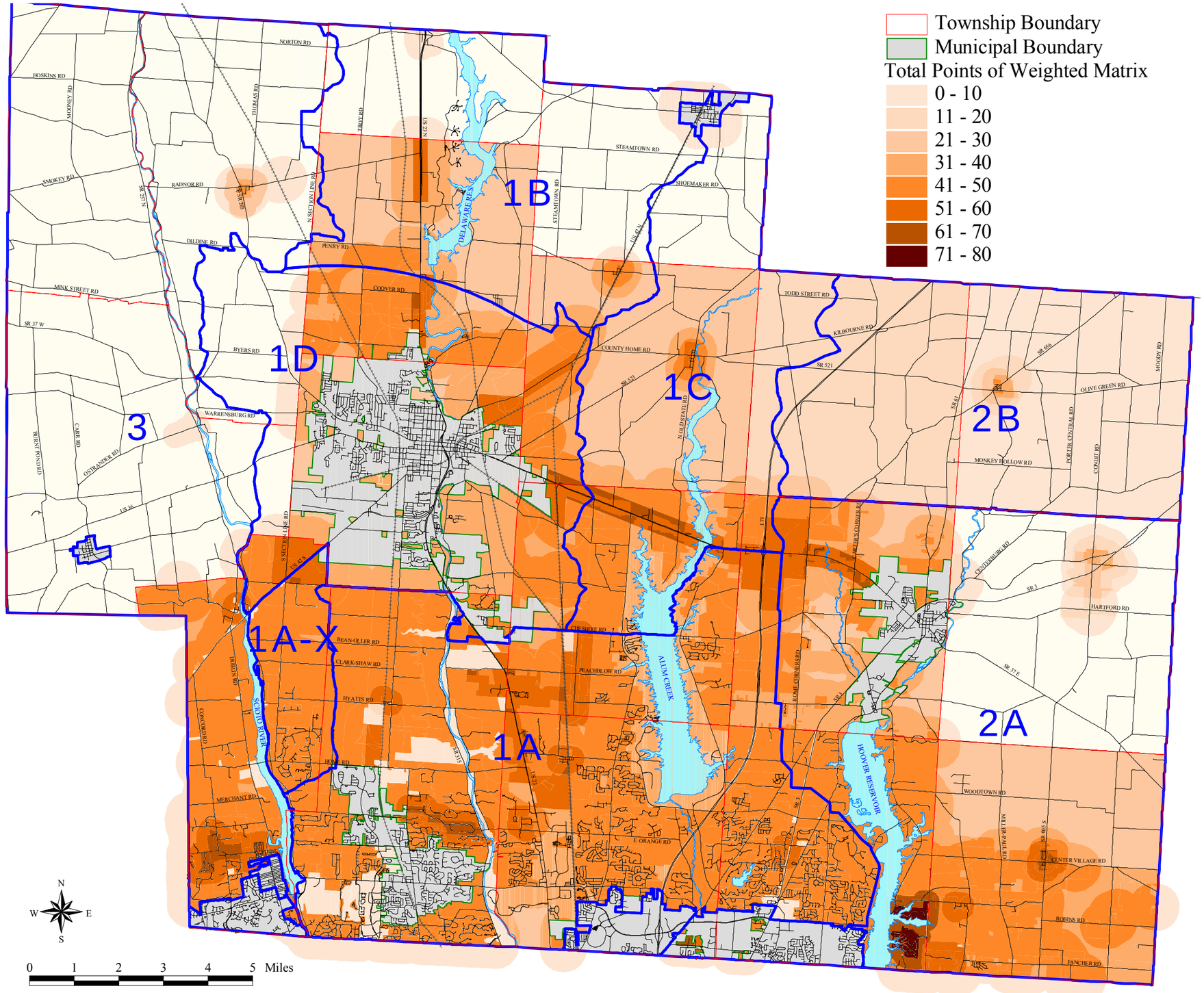

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Appendix T: Sewer Service Priorities
(Exclusive of Cost Consideration)

This map represents the need for sewer service on lands in the County. Six qualifiers were used to determine values to define overall need (priority) for sanitary sewer service:

1. Areas of existing need were valued on a 30-point scale (see Page 6-3).
2. Local government entities that requested for sewer we given 20 points (see Appendix A).
3. Areas defined as corridors of economic development we given 20 points.
4. Townships with locally adopted comprehensive plans were given 10 points.
5. Areas with densities greater than 0.75 du/acre were given 10 points.
6. Areas projected by DCRPC to extend known development patterns were given 10 points.

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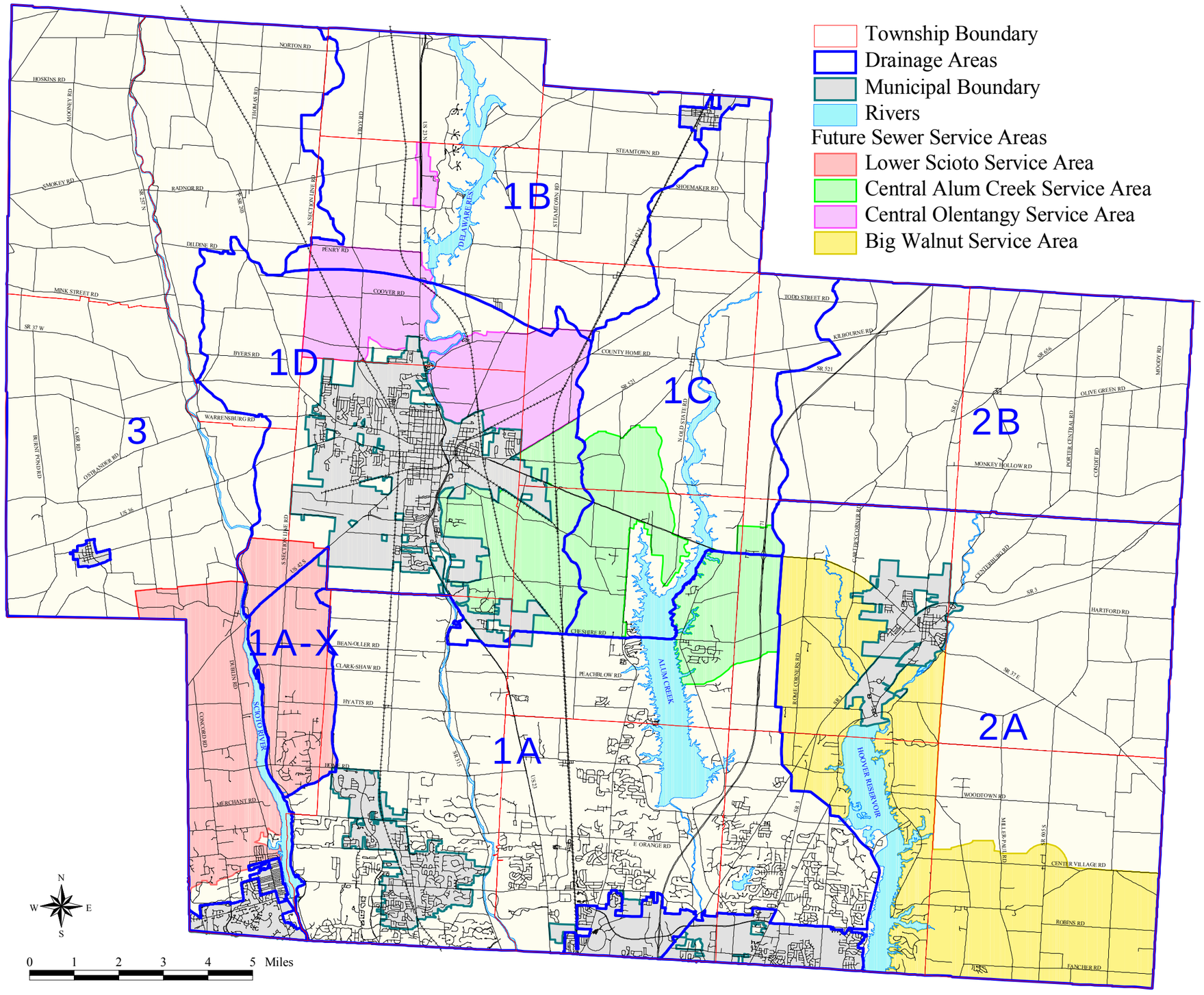

Appendix DD: Future Sewer Service Areas

This map displays the boundaries of four areas recommended for future sewer service. The consultant has been asked to further evaluate potential sewage treatment technologies and costs to sewer these service areas for the Sewer Master Plan Final Report.

- Lower Scioto Service Area
- Central Alum Creek Service Area
- Central Olentangy Service Area
- Big Walnut Service Area

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